APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,335	04/01/2004	Richard W. Citta	P01,0447-02	7549

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SCHIFF HARDIN, LLP	. SINGH, HIRDEPAL	
PATENT DEPARTMENT		
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CHICAGO, IL 60606-6473	2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/815,335	CITTA ET AL.
	Examiner	**Art Unit**	
	Hirdepal Singh	2611	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 July 2007_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _60-84_ is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _60-84_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

     1.☐ Certified copies of the priority documents have been received.

     2.☐ Certified copies of the priority documents have been received in Application No. _____.

     3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Response to Arguments

1.   Applicant's argues that "according to Khayrallah, symbols re-encoded from the symbols decoded by the decoder 58 during a first pass demodulation and the received signal are used to calculate an error, and this error is used to update the channel estimate. Khayrallah asserts that this updated channel estimate allows the channel tracker 50 to more accurately track changes in the channel through which the transmitted information signal reaches the receiver 22. Independent claim 60 - As can be seen from the above description of Khayrallah, Khayrallah fails to disclose decoding a code vector such that the decoding includes deriving a constellation of received signal values corresponding to the code vector, and generating a reliability factor based upon at least one of the received signal values such that the reliability factor is a measure of reliability of the decoding.

The Examiner apparently asserts that the error mentioned in column 12 of Khayrallah somehow corresponds to reliability. However true that assertion may be, it is not true that the error mentioned in column 12 of Khayrallah corresponds to the reliability of the decoder 58 of Khayrallah. The error mentioned in column 12 of Khayrallah is simply the difference between the signal as received and the signal as processed by the receiver 22. The only insight that this error might provide regards the nature of the channel. This error provides no insight as to the reliability of the decoding. Indeed, the decoding could be perfect or less than perfect, and yet the error can not tell the difference. By contrast, the reliability as recited in independent claim 60 is a

measure of the reliability of the decoding. Accordingly, Khayrallah does not disclose the reliability feature of independent claim 60."

2.   However, Examiner traverses applicants opinion as the rejection is made based on the reference as a whole, not just a paragraph or column cited in the office action. Therefore, examiner believes that based on the cited reference(s) the applicants arguments are not persuasive as Khayrallah disclose decoding a coded vector such that the decoding includes deriving a constellation of received signal values corresponding to the code vector (column 3, lines 8-14; column 8, lines 44-60; column 12, lines 22-42), and generating a reliability factor based upon at least one of the received signal values such that the reliability factor is a measure of reliability of the decoding (column 3, lines 41-50; column 11, lines 14-34; column 16, lines 46-59 "describes how the unreliable detection of phase can be made a reliable absolute phase information").

3.   Furthermore, according to Khayrallah the reliability of decoding is improved compared to the conventional methods, as conventional techniques use hard and soft decisions from demodulator and the decoder operate on the m to produce final information. Khayrallah use multipass demodulation to improve the reliability of decoding and to fix the ambiguity of the conventional techniques. Therefore, the rejection to independent claim 60 based on Khayrallah still holds.

4.   Applicant's arguments with respect to amended independent claim 60 and newly added claims 73-84 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 60-65, and 70-76, 78-82 and 84 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Khayrallah et al. (US 6,320,919) in view of Yagyu (US

6,591,390).

Regarding claims 60, 73 and 79:

Khayrallah discloses a method and system for decoding data by using the

decoded data symbols, re-encoding the decoded data to control the equalizer/estimator.

receiving a signal that is encoded at the transmitting end (abstract; column 4,

lines 38-45).

Khayrallah discloses keeping track the values of the received signal/symbol

(column 17, lines 14-35; figure 6);

Khayrallah discloses generating a reliability or quality or error signal by re-

encoding the decoded signal (column 7, lines 3-12, and lines 57-64).

Khayrallah discloses all of the subject matter as described above except for specifically teaching that the received signal contains a code vector; and the reliability factor is a measure of reliability of the decoding. However, it is inherent that the encoded signal received at the receiver is in the form of code vector i.e. the signal may be in the form of 8 bit or 16 bit code for example.

Yagyu in the same field of endeavor discloses an adaptive decoder where the reliability factor is a measure of reliability of the decoding (column 1, lines 45-50).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to use the encoded signal for communication networks and receiving the same at the receiver in the form of code vector and to get the reliability factor based on the decoding in order to check the performance of the system related to the in coming signal whether the system is performing the required operation to get back the information reliably, by using a code vector at the receiver to use the same decoding technique as use at the transmitter to encode the signal.

Regarding claim 61:

Khayrallah discloses all of the subject matter as described above and further discloses that the equalizer/estimator is controlled in accordance with the re-encoded data fed back to the equalizer through characterization estimator 32 (figure 3; column 8, lines 1-40).

Regarding claims 62, 74 and 80:

Khayrallah discloses all of the subject matter as described above and further

discloses that the one of the values of the signal is largest (column 13, lines 19-26).

Regarding claims 63, 75 and 81:

Khayrallah discloses all of the subject matter as described above and further

discloses that the reliability or quality or error signal is generated to control the equalizer

based on re-encoding the decoded signal, the un-decoded signal from the output of

equalizer, and the un-modulated signal from the input of equalizer (figure 3; column 8,

lines 19-42) it is clear that the reliable/control/feed back signal is derived from

comparing the signal values. Furthermore, Khayrallah discloses deriving the

reliable/error signal from the difference between received and predicted data values

(column 12, lines 35-45).

Regarding claims 64, 76 and 82:

Khayrallah discloses all of the subject matter as described above and further

discloses that the reliable factor/signal or error signal or control signal is generated by

using a parameter associated with signal to noise ratio and the coefficient of tap values,

where one of the coefficient of tap values is largest (column 13, lines 1-26), but doesn't

explicitly disclose that the reliable signal/factor is based on the difference between a

largest and next to largest value of received signal. However, the reliability factor/signal

or error signal generated is based on different parameters such as coefficients of tap

values and signal to noise ratio including the largest value as discussed above.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to generate a reliable signal/factor based on the difference

between largest and next to largest value in the received signal. One would have been

motivated to use the largest and next to largest values to generate the reliability

signal/factor to get the decoded data in the same form as it was before the encoding.

Regarding claim 65:

Khayrallah discloses all of the subject matter as described above and further

discloses that the equalizer/estimator is controlled according to the reliability or error

signal generated by using the decoded, encoded signal values (figure 3; column 8, lines

19-40; column 15, lines 36-50).

Regarding claim 70:

Khayrallah discloses all of the subject matter as described above and further

discloses that the received signal values are provided to correlation estimator for

estimating interference (column 7, lines 38-50).

Regarding claims 71, 78 and 84:

Khayrallah discloses all of the subject matter as described above and further

discloses that the reliable or error signal/factor is generated based on the difference

between square of received signal values (column 11, lines 1-12).

Regarding claim 72:

Khayrallah discloses all of the subject matter as described above and further

discloses that the reliable factor/signal or error signal or control signal is generated by

using a parameter associated with signal to noise ratio and the coefficient of tap values,

where one of the coefficient of tap values is largest (column 13, lines 1-26), furthermore

Khayrallah discloses that the reliable or error signal/factor is generated based on the

difference between square of received signal values (column 11, lines 1-14).

Khayrallah discloses all of the subject matter as described above except for

specifically teaching that the reliable signal/factor is based on the difference between

square of largest and next to largest values of received signal. However, the reliability

factor/signal or error signal generated is based on different parameters such as

coefficients of tap values and signal to noise ratio including the square of largest value

as discussed above.

Therefore, it would have been obvious to one having ordinary skill in the art at

the time the invention was made to generate a reliable signal/factor based on the

difference between square of largest and next to largest value in the received signal.

One would have been motivated to use the square of largest and next to largest values

to generate the reliability signal/factor to get the decoded data in the same form as it

was before the encoding.

7.   Claims 66-69, 77 and 83 are rejected under 35 U.S.C. 103(a) as being

unpatentable over <u>Khayrallah et al</u>. (US 6,320,919) in view of <u>Yagyu</u> (US 6,591,390) as

applied to claim 60 above, further in view of <u>Molnar</u> (US 6,567,481).

Regarding claims 66, 77 and83:

<u>Khayrallah</u> discloses all of the subject matter as described above except for

specifically teaching that the reliable signal/factor is generated based on a comparison

of one received signal value to a threshold.

However, <u>Molnar</u> discloses a similar method and receiver for data detection by

using decoded and re-encoded data to generate a reliable or error signal to control the

equalizer, and further discloses that the received signal symbol is adjusted according to

the error or reliable signal until it converges to a predetermined threshold (column 3,

lines 28-41) i.e. the received signal is compared to a threshold.

Therefore, it would have been obvious to one having ordinary skill in the art at

the time the invention was made to compare the received signal value in Khayrallah to a

threshold to generate a reliable signal/factor. One would have been motivated to

compare a received signal value to a threshold to generate the reliable signal/factor to

make sure the weighting of the feedback is within the required limit.

Regarding claim 67:

Khayrallah discloses all of the subject matter as described above and further

discloses that the received signal value is largest one of received signal values (column

13, lines 19-26).

Regarding claim 68:

Khayrallah discloses all of the subject matter as described above except for

specifically teaching that the received signal symbol is adjusted according to the error or

reliable signal until it converges to a predetermined threshold.

Molnar discloses a similar method and receiver for data detection where the

received signal symbol is adjusted according to the error or reliable signal until it

converges to a predetermined threshold (column 3, lines 28-41) i.e. the received signal

is compared to a threshold, but does not explicitly disclose that the reliable signal is

generated if the received signal value is greater than the threshold. However, this is just

a variation of comparison between the received signal value and the threshold to

generate the reliable signal, as threshold is greater than or less than or equal to the

received signal value.

Therefore, it would have been obvious to one having ordinary skill in the art at

the time the invention was made to generate a reliable signal/factor if the compared

received signal value is greater than the threshold. One would have been motivated to

generate the reliable signal/factor if the received signal value is greater than threshold

to make sure the noise or interference level is under a limit.

Regarding claim 69:

<u>Khayrallah</u> discloses all of the subject matter as described above and further

discloses that the generated reliability signal/factor is dependent on the magnitude of

one received signal value (column 13, lines 1-26).

Conclusion

8.   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Hirdepal Singh whose telephone number is 571-270-

1688. The examiner can normally be reached on Mon-Fri (Alternate Friday Off)8:00AM-5:00PMEST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HS
September 27, 2007

SHUWANG LIU
SUPERVISORY PATENT EXAMINER